bp

BP Products North America Inc.
2815 Indianapolis Blvd.
P.O. Box 710
Whiting, IN 46394-0710
USA

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

December 1, 2013

Indiana Department of Environmental Management
OWQ Data Management Section
100 North Senate Avenue
Indianapolis, IN 46206

Subject: NPDES Permit No. 0000108, Semi Annual WET Testing Results

Please find enclosed two copies of the Whole Effluent Toxicity Report for BP Products North America Inc. – Whiting Business Unit for the month of October 2013. Results are reported according to EPA 821-R-02-013 Section 10 (Report Preparation) for NPDES permit IN0000108 (effective 6/21/2007) Outfall 005 Effluent. Chronic Toxicity TUc was 1.0 and Acute Toxicity TUa was <1.0.

BP plans to conduct WET testing in April and October of each calendar year. The next sampling event is scheduled for April 2014 and will incorporate requirements reflected in the new NPDES permit effective November 1st 2013. These changes include the addition of the 7-Day Daphnid (*Ceriodaphnia dubia*) Survival and Reproduction Test.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If you have any questions or need any additional information, please contact Lerato Matlamela at (219) 473-3268.

Sincerely,

N. R.

Nick Spencer
Business Unit Leader

Attachments

CC: Nick Ream (IDEM – Merrillville, IN)

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Sincerely,

N. D. S.

Nick Spencer
Business Unit Leader

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CC: Nick Ream (IDEM – Merrillville, IN)

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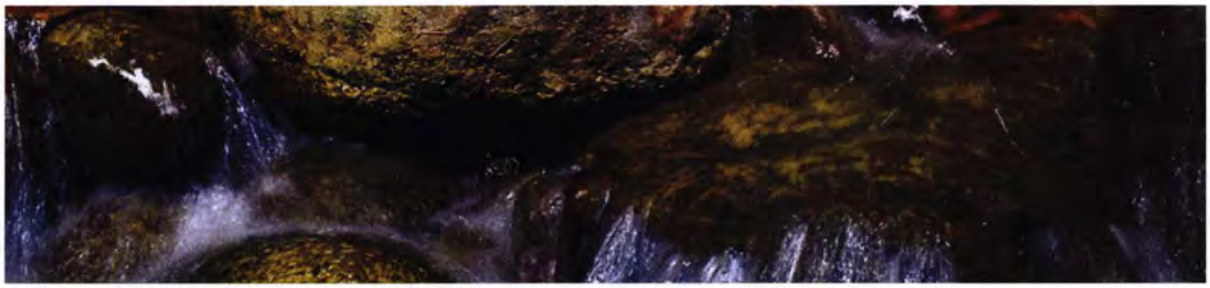


Whole Effluent Toxicity Test Results

Prepared for:
BP Products North America
Whiting, Indiana

Prepared by:
ENVIRON International Corporation
Nashville, Tennessee

Date:
October 2013

Project Number:
20-19696E

ENVIRON

ENVIRON

November 25, 2013

Ms. Rose Hererra
BP Products North America
2831 Indianapolis Blvd., Stop 10-2
Whiting, IN 46394

Re: Whole Effluent Toxicity Test Results – October 2013
ENVIRON Project No. 20-19696E

Dear Ms. Hererra:

Attached are the results of the *Pimephales promelas* (fathead minnow) chronic (7-day) Whole Effluent Toxicity (WET) test performed with composite samples of Outfall 005 effluent. This cover letter contains a test overview and summary of test results. The detailed report formatted to meet guidelines specified in your NPDES discharge permit (i.e., following the outline in Section 10 of EPA 821-R-02-013) is attached.

Three, 24-hour composite samples were evaluated in the WET test. Testing was conducted in accordance with Permit No. IN0000108. Samples were collected on October 7, 9, and 11, 2013, and used at the ENVIRON Toxicology Laboratory within 36 hours of collection and for no longer than 72 hours after first use. All samples arrived at temperatures meeting the USEPA-required receipt temperature range of 0 to 6.0 °C (see chain-of-custody forms). Test organisms were exposed to effluent concentrations of 6.25, 12.5, 25, 50, and 100 percent effluent and a moderately hard water control.

Chronic toxicity test methods followed EPA 821-R-02-013, *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition Section 11.* Fish were fed twice daily with 0.15 g *artemia* (brine shrimp nauplii) that was rinsed with freshwater to remove salinity before use. Test results are presented below:

Chronic Test Results – Outfall 005 Effluent	
96-hr LC50	> 100%
TUa (100/LC50)	< 1.0
NOEC Survival (7 day)	100%
NOEC Growth (7 day)	100%
IC25 (7 day)	> 100%
TUc (100/$NOEC_{growth}$)	1.0

No acute (96 hour) or chronic (7-day) toxicity was observed. The 96-hr LC50 value was greater than 100 percent effluent. The chronic survival and growth NOEC (No Observed Effects

ENVIRON International Corp. 201 Summit View Drive, Suite 300, Brentwood, TN 37027
V +1 615.277.7570 F +1 615.377.4976

Concentration) values were 100 percent effluent. This corresponds to an NOEC-based TUc value of 1.0. The chronic 25 percent Inhibition Concentration (IC25) value was greater than 100 percent effluent.

Test controls met USEPA criteria for test acceptability. The concentration-response relationship for growth is not accurately described in EPA821-B-00-004, *Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing*. The dose-response indicates a flat concentration-response: with no significant effects. Test precision as measured by the Percent Minimum Significant Difference (PMSD) value for this test was 27.3 percent, which is within the USEPA PMSD bounds of 12 to 30 percent for fathead minnow growth. This test is valid for determination of permit compliance. The monthly reference toxicant test for fathead minnow met all test acceptability criteria and was in acceptable range for determining normal test performance.

In accordance with NELAP requirements for listing the number of report pages, this report contains 35 pages, which include the cover letter, detailed report (Attachment 1), associated chemical data (Attachment 2), statistical analyses and raw data (Attachment 3), chain-of-custody forms (Attachment 4), reference toxicant data (Attachment 5), and associated separator pages.

Thank you for the continued opportunity to be of service to BP Products North America. If you have any questions concerning these data, please call Liza Heise at (615) 277-7517.

Sincerely,

Teri L. Horsley
Manager, Ecotoxicology

Robin L. Richards, REM
Principal

Attachment 1:
Detailed Report

BP Whiting Detailed Toxicity Test Report – October 2013 Fathead Minnow Chronic Test

1 Introduction

The BP Whiting Refinery is located in Whiting, Indiana at 2815 Indianapolis Boulevard and discharges treated effluent to Lake Michigan under a National Pollutant Discharge Elimination System (NPDES) permit effective 6/21/2007 (Permit No. IN0000108, 2007) as administered by the Indiana Department of Environmental Management (IDEM). The subject discharge permit requires semi-annual (twice per year) Whole Effluent Toxicity (WET) testing with the fathead minnow. In support of these discharge monitoring requirements, the WET tests described herein were conducted. Testing was performed by:

ENVIRON International Corporation (ENVIRON)
201 Summit View Drive
Lower/Lab Level
Brentwood, TN 37027
(615-277-7554)

The objective of this test was to provide WET test data in support of BP Whiting's NPDES discharge monitoring requirements for Outfall 005.

2 Plant Operations

The BP Whiting Refinery produces various grades of gasoline, diesel and heating fuel, asphalt, and coke, among other products from refined crude oil. The facility operates 24 hours a day, seven days per week under normal operations. Some facility processes are occasionally suspended for maintenance or as a result of unplanned events (e.g., equipment failure, etc.). Wastewater treatment consists of bar screening, grit removal, oil/water separator, storm surge tank, equalization tank, flocculation/flotation, activated sludge, settling and multimedia filtration prior to discharge to Lake Michigan. Wastewater retention time is approximately 17 to 18 hours for the approximate average of 20 MGD discharge through Outfall 005. The design flow of the treatment plant at the time of WET test sampling was 35 MGD.

3 Effluent and Dilution Water

3.1 Effluent Samples

Composite Outfall 005 effluent samples were collected from the Lakefront sample shed at the NPDES permit-specified sample location for WET and chemical sampling of this outfall. Composite samples were obtained from a continuous flow of effluent pulled from the effluent discharge to provide representative effluent samples. The latitude and longitude of this sampling point is 41° 40' 36" N and 87° 28' 16" W. Three effluent samples were collected on the following dates (date indicates the day on which the composite sample was completed): October 7, 9, and 11, 2013. The composite sampler initiated sampling at 0830 for the first sample, 0815 for the second sample, and 0805 for the third sample. Samples were collected hourly for 24 hours on the dates indicated, providing the permit-specified 24 individual

sample aliquots (within a 24 hour period) composited for toxicity testing. An Isco automatic sampler was used to collect the hourly samples that were composited into a common sample container (maintained on ice during collection). WET testing was supported by chemical analyses (Attachment 2). The physical and chemical data associated with each sample used in WET testing are provided on the laboratory bench sheets documenting these and other sample conditions (Attachment 3). The mean daily discharges on sample collection dates were averages of 15.7 mgd, 17.9 mgd, and 15.7 mgd, on October 6-7, 8-9, 10-11, 2013, respectively. Upon arrival at the laboratory, samples were logged in and the temperature was measured and recorded. If the samples were not immediately prepared for testing, they were stored at 0-6 °C until used. The lapsed time between sample collection and receipt at the ENVIRON WET testing laboratory was 24 hours and 30 minutes, 24 hours and 15 minutes, and 24 hours and 15 minutes, for samples received on October 7, 9, and 11, respectively. The respective sample receipt temperatures were 1.9 °C, 0.9 °C, and 0.5 °C. Composite samples were chilled and maintained at 0-6 °C until used, to inhibit microbial degradation, chemical transformations, and loss of highly volatile toxins.

The first sample was used to initiate the test and for the first day of testing (test days 0 and 1). The second sample was utilized for two days (test days 2 and 3), and the third sample was used for the remainder of the test (test days 4, 5, and 6). All of the samples were utilized within 36 hours of sample collection and for not longer than 72 hours after first use.

3.2 Dilution Water

The dilution and control water for this test was USEPA moderately hard water, prepared in accordance with EPA 821-R-02-013. The water was prepared by ENVIRON using de-ionized water to which the four reagent-grade salts specified by USEPA were added and aerated for a minimum of 24 hours before use. No pre-treatment of the water occurred following this preparation. As detailed in Attachment 3, dilution water hardness and alkalinity ranged from 80.8 to 84.8 mg/L $CaCO_3$ and from 43 to 45 mg/L $CaCO_3$, respectively. Control water pH ranged from approximately 7.6 to 8.0 s.u., and dissolved oxygen was 7.9 mg/L or greater during the test.

Conductivity, alkalinity, and hardness were measured on each of the three effluent samples and on each batch of control water prior to first use.

A 0.5 dilution series was used to generate the appropriate test dilutions.

4 Test Method

The fathead minnow chronic WET test method detailed in Section 1000.0 of EPA 821-R-02-013 (*Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms – Fourth Edition*) was followed. Per the method, seven-day fathead minnow survival and growth (dry weight), were the test endpoints assessed. There were no deviations from this test method. The test was initiated at 1410 on October 8th and terminated at 1220 on October 15th. Disposable plastic 400 mL test vessels containing 350 mL test solutions were used. Four replicate exposures of 10 organisms were used for each of the five effluent exposures and the control exposures. Test organisms had been acclimated to the control water at 24 °C prior to test initiation. Test temperatures ranged from 24.0 to 25.0 °C. Neither aeration nor pH adjustment were required during the test. Test organisms were fed a minimum of 0.15 g of live Artemia (brine shrimp) nauplii twice daily in

approximately 6 hour time periods. Test organisms were fed in the morning, at least two hours prior to test solution renewal, and again after renewal, at the end of the day. Brine shrimp were rinsed with freshwater to remove salinity prior to use in tests. Test solutions were renewed daily. Any dead brine shrimp or debris was removed from the test vessel each day by use of a disposable pipette.

During the test, the DO, pH, and conductivity were measured at the beginning and end of each 24-hour exposure in at least one test chamber. Temperature was measured at the end of each 24-hour exposure in at least one test chamber.

5 Test Organisms

Fathead minnows (*Pimephales promelas*) less than 24 hours old at test initiation were used in this testing. Organisms were obtained from a commercial laboratory (Environmental Consulting and Testing) with whom ENVIRON has a long-standing record of successful use in WET tests. Organisms were obtained from laboratory-reared stock traceable to USEPA cultures. Taxonomic verification is provided by the laboratory. No treatments for disease were used on the fish used in these WET tests.

6 Quality Assurance

Reagent grade sodium chloride (NaCl, Reagents, Inc.) is used in monthly reference toxicant tests conducted to document test organism sensitivity and test endpoint precision. Organisms tested are from the same commercial source used in WET tests, and organism handling and testing in reference toxicant tests is identical to that of WET tests. At the time of this test, the most recently completed reference toxicant test was initiated on October 1, 2013. This test was found to be within method-specified control bounds as indicated in Attachment 5 where the control chart is provided. USEPA moderately hard water was the dilution and control water in all reference toxicant tests. The 25 percent inhibition concentration is used to track reference toxicant test performance and as such the percent minimum significant difference statistic is not applicable. As documented in ENVIRON's Standard Operating Procedures (SOP) manual, pH, dissolved oxygen, and conductivity meters calibrated daily according to manufacturer's instructions were used to document these water quality conditions during reference toxicant tests. Standard, titration-based methods were used to document control water hardness and alkalinity as specified in the ENVIRON SOP manual.

7 Results

Raw WET test data are provided in Attachment 3, serving as documentation of the daily effects observed in each test and control replicate. Final test results are also provided in graphical form in Attachment 3 for the specified biomass basis (i.e., integration of survival and growth endpoints). Commercial software (CETIS v1.8.4.22), which is designed specifically to meet USEPA-specified statistical requirements outlined in Section 9.0 of EPA 821-R-02-013 was used for analysis of the fathead minnow survival and growth data. All of the physical and chemical data associated with the toxicity tests are listed in the test bench sheets provided in Attachment 3. In summary, these are:

Parameter (units)	Range observed in Test (all exposures, excluding control)
pH (s.u.)	7.62 to 8.23
Dissolved Oxygen (mg/L)	8.1 to 8.6
Conductivity (umhos/cm)	255 to 1383
Temperature (°C)	24.0 to 25.0
Alkalinity (mg/L $CaCO_3$)	152 to 168 (100% effluent)
Hardness (mg/L $CaCO_3$)	216 to 232 (100% effluent)

No acute (96 hour) toxicity (greater than ten percent) or chronic (7-day) toxicity (greater than twenty percent) was observed. The 96-hr LC50 value was greater than 100 percent effluent. The chronic survival and growth NOEC (No Observed Effects Concentration) values were 100 percent effluent. This corresponds to an NOEC-based TUc value of 1.0. The chronic 25 percent Inhibition Concentration (IC25) value was greater than 100 percent effluent.

Test controls met USEPA criteria for test acceptability. The concentration-response relationship for growth is flat and not described in EPA821-B-00-004, *Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing*. The dose-response indicates a flat concentration-response and no toxicity. Test precision as measured by the Percent Minimum Significant Difference (PMSD) value for this test was 27.3 percent, which is within the USEPA PMSD bounds of 12 to 30 percent for fathead minnow growth, indicating acceptable test precision. This test is valid for determination of permit compliance. The monthly reference toxicant test for fathead minnow met all test acceptability criteria and was in acceptable range for determining normal test performance.

Attachment 4 contains chain-of-custody documentation.

8 Conclusions and Recommendations

There are no WET permit limits in the current NPDES discharge permit (IN0000108, 2007). Monitoring is required twice per year. No acute or chronic toxicity was indicated during this test.

Attachment 2:
Chemical Data

ENVIRON Test Log No. 46388

OCTOBER 2013

			Sunday				Tuesday				Thursday			
LIMS ID			10/6/2013				10/8/2013				10/10/2013			
			2129835/2130187				2130635/2131034				2131507/2131887			
Parameter	Units of Measure	Analysis Method	Result	Comp/Grab	Sample Date	Tech	Result	Comp/Grab	Sample Date	Tech	Result	Comp/Grab	Sample Date	Tech
BOD5	mg/L	SM 5210 B	0.4	Comp	10/6/2013	JPO/CRS	0.3	Comp	10/8/2013	JPO	0.5	Comp	10/10/2013	JPO
TSS	mg/L	SM 2540 D	0.8	Comp	10/6/2013	CRS	0.8	Comp	10/8/2013	CRS	1.6	Comp	10/10/2013	CRS
COD	mg/L	SM 5220 D	20	Comp	10/6/2013	JPO	17	Comp	10/8/2013	CRS	15	Comp	10/10/2013	CRS
Oil & Grease	mg/L	EPA 1664A	<0.3	Grab	10/7/2013	CRS	<0.3	Grab	10/9/2013	CRS	<0.3	Grab	10/11/2013	CRS
Ammonia	mg/L	SM 4500 NH3 F	<0.10	Comp	10/6/2013	JPO	<0.10	Comp	10/8/2013	JPO	<0.10	Comp	10/10/2013	JPO
Total Chromium	mg/L	SM 3111 B	<0.01	Comp	10/6/2013	JPO	<0.01	Comp	10/8/2013	JPO	<0.01	Comp	10/10/2013	JPO
Hexavalent Cr	mg/L	SM 3500 Cr D	<0.005	Grab	10/7/2013	JPO	<0.005	Grab	10/9/2013	JPO	<0.005	Grab	10/11/2013	JPO
Phenolics	mg/L	SM 5530 D / EPA 420.1	<0.01	Comp	10/6/2013	JPO	<0.01	Comp	10/8/2013	JPO	<0.01	Comp	10/10/2013	JPO
Phospsorous (PO4)	mg/L	SM 4500 P	0.12	Comp	10/6/2013	CRS	0.25	Comp	10/8/2013	CRS	0.19	Comp	10/10/2013	CRS
Sulfides	mg S2-/L	SM 4500 S2- D	0.01	Comp	10/6/2013	JPO	0.01	Comp	10/8/2013	JPO	0.01	Comp	10/10/2013	CRS
pH	S.U.	SM 4500 H+ B	7.8	Grab	10/7/2013	TT	7.80	Grab	10/9/2013	JC	7.7	Grab	10/11/2013	JC
Microbac Tests														
Total Mercury	ng/L		<0.500	Grab	10/6/2013	Microbac	*<0.500	Grab	10/8/2013	Microbac	<0.500	Grab	10/10/2013	Microbac
Total Vanadium	mg/L		0.016	Comp	10/6/2013	Microbac	0.024	Comp	10/8/2013	Microbac	0.013	Comp	10/10/2013	Microbac

*The result of this test in invalid; did not meet BP's QA/QC validation protocol.

Attachment 3:
Statistical Analysis and Raw Data

Fathead Minnow 7-d Larval Survival and Growth Test — ENVIRON International Corp

Analysis ID:	02-3944-5929	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.4
Analyzed:	22 Oct-13 9:06	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	NA	C > T	NA	NA	100	>100	NA	1	11.4%

Steel Many-One Rank Sum Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		6.25	18.5	10	1	6	0.8729	Asymp	Non-Significant Effect
		12.5	13.5	10	1	6	0.2853	Asymp	Non-Significant Effect
		25	20	10	1	6	0.9516	Asymp	Non-Significant Effect
		50	18	10	2	6	0.8333	Asymp	Non-Significant Effect
		100	12.5	10	1	6	0.1834	Asymp	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.95	0.8 - NL	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.2096305	0.04192611	5	3.982	0.0131	Significant Effect
Error	0.1895379	0.01052988	18			
Total	0.3991684		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	0.3166	4.248	0.8965	Equal Variances
Variances	Levene Equality of Variance	2.85	4.248	0.0457	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8298	0.884	0.0009	Non-normal Distribution

7d Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	0.95	0.7909	1	1	0.8	1	0.05	10.53%	0.0%
6.25		4	0.975	0.8954	1	1	0.9	1	0.025	5.13%	-2.63%
12.5		4	0.875	0.7954	0.9546	0.9	0.8	0.9	0.025	5.71%	7.9%
25		4	1	1	1	1	1	1	0	0.0%	-5.26%
50		4	0.95	0.7909	1	1	0.8	1	0.05	10.53%	0.0%
100		4	0.825	0.7454	0.9046	0.8	0.8	0.9	0.025	6.06%	13.16%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	1.336	1.093	1.578	1.412	1.107	1.412	0.07622	11.41%	0.0%
6.25		4	1.371	1.242	1.501	1.412	1.249	1.412	0.04074	5.94%	-2.66%
12.5		4	1.214	1.101	1.326	1.249	1.107	1.249	0.03547	5.85%	9.15%
25		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.0%	-5.71%
50		4	1.336	1.093	1.578	1.412	1.107	1.412	0.07622	11.41%	0.0%
100		4	1.143	1.03	1.256	1.107	1.107	1.249	0.03547	6.21%	14.46%

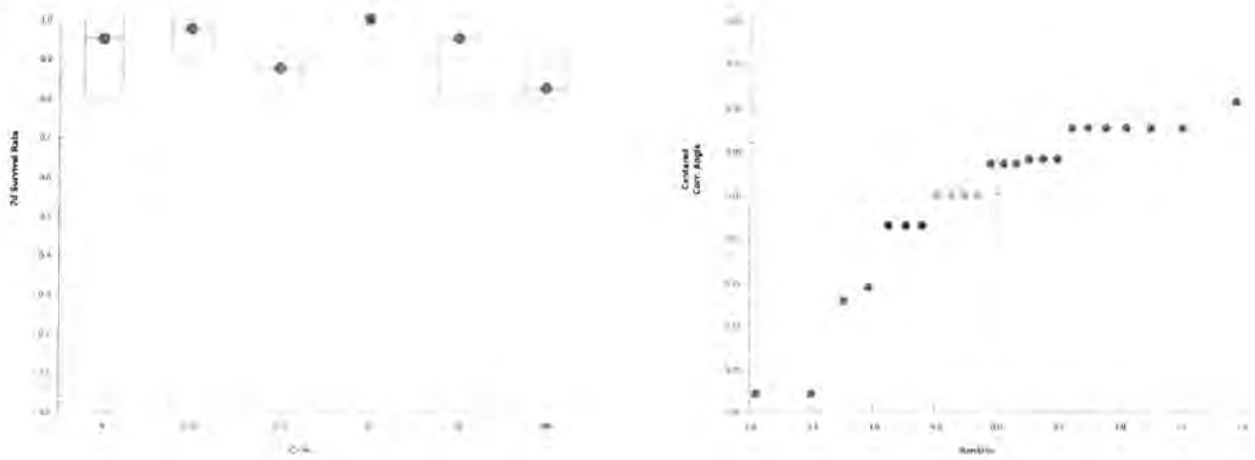
7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	10/10	8/10	10/10	10/10
6.25		10/10	10/10	9/10	10/10
12.5		9/10	9/10	9/10	8/10
25		10/10	10/10	10/10	10/10
50		8/10	10/10	10/10	10/10
100		9/10	8/10	8/10	8/10

Fathead Minnow 7-d Larval Survival and Growth Test **ENVIRON International Corp**

Analysis ID:	02-3944-5929	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.4
Analyzed:	22 Oct-13 9:06	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics



Fathead Minnow 7-d Larval Survival and Growth Test — **ENVIRON International Corp**

Analysis ID:	19-0495-1278	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.4
Analyzed:	22 Oct-13 9:06	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	NA	C > T	NA	NA	100	>100	NA	1	27.3%

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		6.25	-1.494	2.407	0.086	6	0.9958	CDF	Non-Significant Effect
		12.5	-2.377	2.407	0.086	6	0.9997	CDF	Non-Significant Effect
		25	-2.938	2.407	0.086	6	1.0000	CDF	Non-Significant Effect
		50	-3.457	2.407	0.086	6	1.0000	CDF	Non-Significant Effect
		100	-1.192	2.407	0.086	6	0.9899	CDF	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.3143	0.25 - NL	Yes	Passes Acceptability Criteria
PMSD	0.2731	0.12 - 0.3	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.04069892	0.008139784	5	3.202	0.0306	Significant Effect
Error	0.04575735	0.002542075	18			
Total	0.08645627		23			

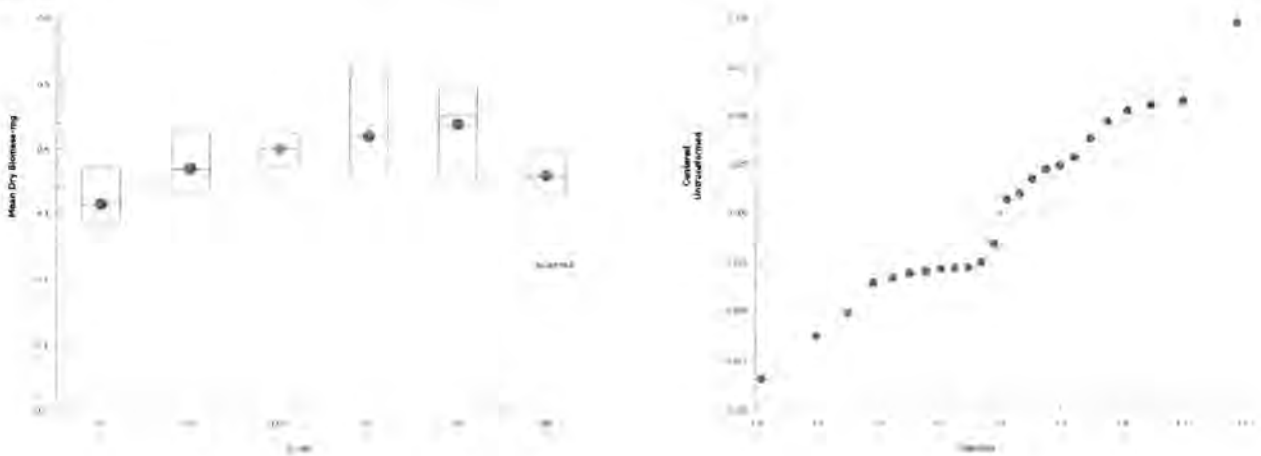
Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	4.158	15.09	0.5268	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9645	0.884	0.5352	Normal Distribution

Mean Dry Biomass-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	0.3143	0.2571	0.3714	0.305	0.286	0.361	0.01797	11.44%	0.0%
6.25		4	0.3675	0.3054	0.4296	0.358	0.334	0.42	0.01952	10.62%	-16.94%
12.5		4	0.399	0.3557	0.4423	0.402	0.369	0.423	0.01359	6.81%	-26.97%
25		4	0.419	0.3018	0.5362	0.402	0.356	0.516	0.03682	17.58%	-33.33%
50		4	0.4375	0.3275	0.5475	0.451	0.353	0.495	0.03457	15.8%	-39.22%
100		4	0.3568	0.2952	0.4183	0.3555	0.321	0.395	0.01933	10.84%	-13.52%

Graphics



CETIS Analytical Report

Fathead Minnow 7-d Larval Survival and Growth Test — **ENVIRON International Corp**

Analysis ID:	02-4238-0467	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.4
Analyzed:	22 Oct-13 9:06	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	64170	1000	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.3143	0.25 - NL	Yes	Passes Acceptability Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC25	>100	N/A	N/A	<1	NA	NA

Mean Dry Biomass-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.3143	0.286	0.361	0.01797	0.03594	11.44%	0.0%
6.25		4	0.3675	0.334	0.42	0.01952	0.03903	10.62%	-16.94%
12.5		4	0.399	0.369	0.423	0.01359	0.02718	6.81%	-26.97%
25		4	0.419	0.356	0.516	0.03682	0.07364	17.58%	-33.33%
50		4	0.4375	0.353	0.495	0.03457	0.06913	15.8%	-39.22%
100		4	0.3568	0.321	0.395	0.01933	0.03867	10.84%	-13.52%

Graphics

ENVIRON FATHEAD MINNOW SURVIVAL AND GROWTH 7-DAY CHRONIC TOXICITY TEST
EPA-821-R-02-013 Method 1000.0

TEST LOG NO: 16369
JOB NUMBER: 20-19696D
INDUSTRY: BP Whiting
EFFLUENT: Outfall 005
DILUTION WATER: Mod Hard
NPDES: Yes X No
FOOD BATCH: 43578

BEGINNING: HRS: 1410 DATE: 10/8/13
ENDING: HRS: 1220 DATE: 10/15/13
TEST DILUTIONS: 6.25 - 100
ORGANISM AGE (date): 10/7/13
ORGANISM SOURCE: ECT # 4469
SOURCE TEMP @ TEST START: 24.2
RANDOMIZED BY: TLH

PHOTOPERIOD: 16 hr light/8 hr dark
FEEDING REGIME: 0.15 mL Artemia @ 2 times/day
TEST VESSEL CAPACITY: 450 mL
TEST SOLUTION VOLUME: 250 - 300 mL
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
Mod Hard	A	10	10	10	10	10	10	10	10
	B	10	10	9	9	9	9	9	8
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
	E								
	Temp(°c):old/new	24.2	24.8/24.4	24.5/24.3	24.3/24.0	24.1/24.2	24.1/24.0	24.0/24.1	24.1
6.25%	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	9	9	9	9	9	9
	D	10	10	10	10	10	10	10	10
	E			10 CR					
	Temp(°c):old/new	24.3	25.0/24.5	24.0/24.4	24.2/24.5	24.0/24.1	24.0/24.1	24.0/24.1	24.1
12.5%	A	10	10	10	10	10	10	9	9
	B	10	10	9	9	9	9	9	9
	C	10	10	10	10	10 → 9	9	9	9
	D	10	10	9	8	8	8	8	8
	E								
	Temp(°c):old/new	24.3	24.7/24.5	24.6/24.5	24.2/24.5	24.1/24.2	24.1/24.1	24.0/24.3	24.3
25%	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
	E								
	Temp(°c):old/new	24.3	24.6/24.4	24.8/24.5	24.4/24.5	24.1/24.4	24.1/24.2	24.1/24.3	24.0
50%	A	10	10	8	8	8	8	8	8
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
	E								
	Temp(°c):old/new	24.4	25.0/24.6	24.5/24.3	24.3/24.4	24.1/24.1	24.3/24.2	24.0/24.4	24.0
100%	A	10	10	10	10	10	10	10	9
	B	10	10	10	9	9	8	8	8
	C	10	10	9	9	9	9	8	8
	D	10	10	10	9	9	9	9	8
	E								
	Temp(°c):old/new	24.4	24.8/24.3	24.5/24.6	24.1/24.0	24.0/24.2	24.4/24.3	24.0/24.4	24.1
Test Renewal	Time	1410	1055	1130	1012	1100	1100	1000	1220
	Date	10/8/13	10/9/13	10/10/13	10/11/13	10/12/13	10/13/13	10/14/13	10/15/13
	Initials	TLH	CR	CR	CR	AW	AW	AW	AW
morning feeding	Int/Time		LM0700	LM0710	LM0700	AW0730	AW0750	LM0700	
afternoon feeding	Int/Time	AD1440	AM1300	AD1330	HM1300	AW1330	AW1350	AW1300	

ENVIRON FATHEAD MINNOW SURVIVAL AND GROWTH 7-DAY CHRONIC TOXICITY TEST
EPA-821-R-02-013 Method 1000.0

TEST LOG NO.: 16369 BEGINNING: HRS: 1410 DATE: 10/8/13
JOB NO.: 20-19696D ENDING: HRS: 1220 DATE: 10/15/13
INDUSTRY: BP Whiting
EFFLUENT: Outfall 005 NO. ORGANISMS/TREATMENT: 10
NPDES: Yes X No ____ NO. REPLICATES: 4

PHOTOPERIOD: 16 hr light
FEEDING REGIME:
0.15 mL Artemia @ 2 times/day
TEST VESSEL CAPACITY: 450 mL
TEST SOLUTION VOLUME: 250 mL

		GROWTH RESULTS						
CONC (%)	REP ID	Boat ID 49	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Fish Wt (mg) Per Final # of Fish	
Mod Hard	A	1	1.13999	1.14323	0.00324	10	0.324	
	B	2	1.06017	1.06303	0.00286	8	0.378	AVG Control
	C	3	1.06632	1.06918	0.00286	10	0.286	Fish wt: 0.337
	D	4	1.13025	1.13386	0.00361	10	0361	(using final #)
	E							
6.25%	A	5	1.09652	1.10072	0.00420	10		
LM 10/11	B	6	1.10563	1.10937	0.00374	10		
1.10187	C	7	1.10687	1.11021	0.00334	9		Oven ID: 2
	D	8	1.06532	1.06874	0.00342	10		
	E							Tins In:
12.5%	A	9	1.09770	1.10193	0.00423	9		Date: 10/15/13
	B	10	1.09864	1.10233	0.00369	9		Time: 1240
	C	11	1.10542	1.10925	0.00383	9		Temp (°C) 10.2
	D	12	1.10143	1.10564	0.00421	8		Initials: AW
	E							
25%	A	13	1.08869	1.09305	0.00436	10		Tins Out:
	B	14	1.10905	1.11261	0.00356	10		Date: 10/16/13
	C	15	1.10090	1.10458	0.00368	10		Time: 1332
	D	16	1.09606	1.10122	0.00516	10		Temp (°C): 10.0
	E							Initials: LM
50%	A	17	1.09912	1.10321	0.00409	8		
	B	18	1.08142	1.08635	0.00493	10		
	C	19	1.08651	1.09146	0.00495	10		
	D	20	1.11020	1.11373	0.00353	10		
	E							
100%	A	21	1.10060	1.10386	0.00326	9		FINAL WEIGHTS
	B	22	1.10601	1.10922	0.00321	8		
	C	23	1.09983	1.10368	0.00385	8		DATE: 10/16/13
	D	24	1.08773	1.09168	0.00395	8		INITIALS: LM
	E							
	A							
	B							
	C							
	D							
	E							
	Initials / Date:		LM 10/11					

TEST LOG NO. 16369 CLIENT/SAMPLE ID: BP Whiting

JOB NO Z0-19696D TEST ORGANISM: FM DATE 10/8/13

ENVIRON Test Log No. 16369

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D.O. (mg/L)

Concentration	Start	Day 1 Old	Day 1 New	Day 2 Old	Day 2 New	Day 3 Old	Day 3 New	Day 4 Old	Day 4 New	Day 5 Old	Day 5 New	Day 6 Old	Day 6 New	Day 7
MH	8.3	8.6	8.4	8.4	8.3	7.9	8.3	8.4	8.5	8.6	8.9	7.9	8.7	8.6
6.25%	8.3	8.6	8.5	8.3	8.5	8.3	8.2	8.6	8.2	8.6	8.7	8.4	8.6	8.6
12.5%	8.3	8.6	8.3	8.3	8.6	8.3	8.4	8.5	8.2	8.5	8.8	8.3	8.3	8.5
25%	8.2	8.6	8.4	8.2	8.4	8.3	8.4	8.5	8.3	8.5	8.6	8.2	8.3	8.6
50%	8.2	8.5	8.2	8.4	8.3	8.4	8.3	8.5	8.4	8.6	8.3	8.3	8.3	8.6
100%	8.2	8.6	8.3	8.4	8.4	8.4	8.3	8.4	8.4	8.6	8.0	8.7	8.1	8.9

pH (s.u.)

Concentration	Start	Day 1 Old	Day 1 New	Day 2 Old	Day 2 New	Day 3 Old	Day 3 New	Day 4 Old	Day 4 New	Day 5 Old	Day 5 New	Day 6 Old	Day 6 New	Day 7
MH	7.79	7.74	7.73	7.70	7.81	7.66	7.81	7.64	7.87	7.75	8.05	7.85	7.97	7.98
6.25%	7.85	7.71	7.87	7.69	7.92	7.70	7.96	7.63	7.90	7.62	8.04	7.80	7.97	7.96
12.5%	7.94	7.68	7.97	7.74	7.93	7.71	8.09	7.70	7.93	7.64	8.04	7.82	7.96	7.96
25%	8.00	7.70	8.04	7.81	7.96	7.86	8.11	7.90	7.98	7.89	8.04	7.78	7.92	7.96
50%	8.03	7.75	8.11	7.98	8.03	7.89	8.12	AW 8.0	AW 8.03	8.05	8.04	7.86	8.01	7.98
100%	8.06	8.00	8.17	8.22	8.12	8.17	8.11	8.23	8.04	8.17	8.03	8.06	8.06	7.96

Conductivity (µmhos/cm)

Concentration	Start	Day 1 Old	Day 1 New	Day 2 Old	Day 2 New	Day 3 Old	Day 3 New	Day 4 Old	Day 4 New	Day 5 Old	Day 5 New	Day 6 Old	Day 6 New	Day 7
MH	212	201	224	211	205	209	219	217	220	214	227	266	219	262
6.25%	270	255	336	305	311	264	334	302	318	322	298	332	292	332
12.5%	361	346	408	383	372	367	356	371	358	345	375	411	354	385
25%	497	466	531	510	491	442	464	530	456	520	534	521	504	513
50%	765	709	812	788	682	680	716	757	635	799	813	815	743	761
100%	1268	1265	1333	1343	1325	1332	1301	1216	1358	1268	1383	1297	1354	1285

Params Init/Time:	TLH 1000	LH0716	CR 0900	LH0713	CR 0910	LH0653	CR 0820	AW 0745	CR 0945	AW 0812	AW 0840	AW 0805	AW 0855	AW 1354
Dilutions Init/Time:	TLH 0940		CR 0550		CR 0900		CR 0810		CR 0935		AW 0830		AW 0845	
Control Water Batch:	5335		5333		5333		5338		5340		5340		5343	
Food Batch	4373		4378		4376		4376		4378		4375		4375	

E:\Ecotox Lab\LABFORMS\Client Test Sheets\BP Whiting\Param and Batch Sheet

TEST LOG NO. 16369 CLIENT: BP Whiting DATE OF TEST: 10/8/13

JOB NO. 20-19696D TEST TYPE(S) PERFORMED: Fm Chronic

100% EFFLUENT

Batch #	Sample ID	Sample Date	1st Use Date	Hardness mg/L CaCO3	Alkalinity mg/L	TRC mg/L	NH_3N mg/L
16728	Outfall 005	10/6-7/13	10/8/13	216	168	0.06	0.40
16746	Outfall 005	10/8-9/13	10/10/13	224	152	0.08	0.32
16756	Outfall 005	10/10-11/13	10/12/13	232	155	<0.02	0.28

CONTROL / DILUTION WATER

Batch #	Sample ID	Sample Date	1st Use Date	Hardness mg/L CaCO3	Alkalinity mg/L	TRC mg/L
5335	MH	10/5/13	10/7/13	81.6	43	<0.02
5333	MH	10/4/13	10/9/13	83.2	45	<0.02
5338	MH	10/7/13	10/10/13	84.3	44	<0.02
5340	MH	10/9/13	10/12/13	84.8	44	<0.02
5343	MH	10/12/13	10/14/13	80.8	43	<0.02

Attachment 4:
Chain-of- Custody Forms

ENVIRON Test Log No. 16369

Project Name: 005 BP WET Testing Project Number: 20-19696 E

Industry:

Phone: 219-473-3726 FAX:

County: Lake City: Whiting State: Indiana

Sample Collected by (print): Terry Claus

Sample Collected by (signature): Terry Claus

NPDES Permit No.:

NPDES Test: ☐ No ☐ Yes

CHAIN-OF-CUSTODY

ENVIRON
201 Summit View Drive, Suite 300
Brentwood, TN 37027
PHONE: (615) 277-7570
FAX: (615) 377-4976

Sample Location / ID	Comp/Grab	Container Type	Chilled During Collection (Y/N)	Start Date/Time	End Date/Time	No. of Cntrs	Total Volume in liters	Analysis Requested: Acute Fathead minnow	Acute Bannerfin shiner	Acute *Ceriodaphnia dubia*	Acute *Daphnia pulex*	Chronic Fathead minnow	Chronic *Ceriodaphnia dubia*	Continuous Batch Tests	Discrete Batch Tests	Other Toxicity Testing	Description Definitive or Screen	Sample B# (lab only)
OUTFALL 005	Comp	10L	Yes	10-6-13 0830	10-7-13 0830	1	9									X		16728

* Matrix: **SS** - Soil **GW** - Groundwater **WW** - Wastewater **AW** - Ambient Water **ML** - Mixed Liquor **SL** - Sludge **SD** - Sediment **OT** - Other _____

Remarks: Composite Samples well chilled during collection and packed with sufficient ice to ensure a laboratory arrival Temperature of 0.6 degrees C.

Measured TRC (if applicable): _____ mg/L

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Samples shipped via: ■ FedEx ☐ Other Courier ☐ UPS ☐ Hand Delivered	Condition: (lab use only)
Terry Claus	10-7-13	14:00			
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Receipt Temp: 1.9°C	Containers/Volume Received: 1 10L
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature) Anita Bryant-Winton	Date: 10/8/13	Time: 0900 pH upon arrival: 8.02 DO upon arrival: 9.5

From: (219) 805-3821
Terry Claus

5900 Industrial Highway

Gary, IN 46406

Origin ID: MGCA

FedEx Express

Ship Date: 07OCT13
ActWgt: 60.0 LB
CAD: 105107501/NET3430

Dims: 24 X 13 X 14 IN

Delivery Address Bar Code

SHIP TO: (615) 277-7570

BILL SENDER

Sample Receiving
ENVIRON
201 Summit View Drive
Lower Level Lab
BRENTWOOD, TN 37027

Ref # 20-19696E
Invoice #
PO #
Dept #

TUE - 08 OCT 10:30A
PRIORITY OVERNIGHT

TRK# 0201 7968 5283 2300

NA THAA

37027
TN-US
BNA

51AG1/AB1B/1A9E

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

CUSTODY SEAL

Person Collecting Sample Terry Clay (signature)

Date Collected 10-7-13 Time Collected

Sample Receipt Checklist:

Client: BP Whiting

Date/Time received 10/8/13 0900 by AW

1. Cooler sealed and intact upon arrival?	Yes	No
2. Custody seals present?	Yes	No
3. Samples received below 6 degrees Celsius?	Yes	No
4. Was ice present?	Yes	No
5. Is the COC filled out correctly including the sample date/time and signed?	Yes	No
6. Was the sample received within 36 hours of collection?	Yes	No
7. Did the sample(s) arrive in good condition?	Yes	No
8. Was pH and DO measured and in range?	Yes	No
9. Was residual chlorine present?	Yes	No
➢ 1.0 mg/L? (did dechlor occur)	Yes	No

Comments:

Batch #	Sample ID	Temp (C°)	pH	DO	TRC
16728	Outfall 005	1.9	8.02	9.5	3.06

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ENVIRON Test Log No. 16369

Project Name: 005B & WET Testing Project Number: 20-17676E

Industry:

Phone: 219-473-3726 FAX:

County: Lake City: Whiting State: Indiana

Sample Collected by (print): Terry Clavs

Sample Collected by (signature): Terry Clavs

NPDES Permit No.:

NPDES Test: ☐ No ☐ Yes

CHAIN-OF-CUSTODY

ENVIRON
201 Summit View Drive, Suite 300
Brentwood, TN 37027
PHONE: (615) 277-7570
FAX: (615) 377-4976

Sample Location / ID	Comp/Grab	Container Type	Chilled During Collection (Y/N)	Start Date/Time	End Date/Time	No. of Cntrs	Total Volume in liters	Analysis Requested: Acute Fathead minnow	Acute Bannerfin shiner	Acute *Ceriodaphnia dubia*	Acute *Daphnia pulex*	Chronic Fathead minnow	Chronic *Ceriodaphnia dubia*	Continuous Batch Tests	Discrete Batch Tests	Other: Toxicity Testing	Description Definitive or Screen	Sample B# (lab only)
Outfall 005	Comp	10L	Yes	15:57-13 0815	15:57-13 0815	1	9									X		107446

* Matrix: **SS** - Soil **GW** - Groundwater **WW** - Wastewater **AW** - Ambient Water **ML** - Mixed Liquor **SL** - Sludge **SD** - Sediment **OT** - Other

Remarks: Composite Samples were chilled during collection and packed with sufficient ice to ensure a laboratory arrival temperature of 0-6 degrees C.

Measured TRC (if applicable): _____ mg/L TC

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Samples shipped via: ☒ FedEx ☐ Other Courier ☐ UPS ☐ Hand Delivered	Condition: (lab use only)
Terry Clavs	10-9-13	14:00			good
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Receipt Temp: 0.9 °C	Containers/Volume Received: 10L
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 10/10/13	Time: 0830

pH upon arrival: 6.11

DO upon arrival: 8.4

25 of 35

From: (219) 805-3821
Terry Claus

5900 Industrial Highway

Gary, IN 46406

Origin ID: MGCA

FedEx Express

J1320130628032S

Ship Date: 09OCT13
ActWgt: 60.0 LB
CAD: 105107501/INET3430

Dims: 24 X 13 X 14 IN

Delivery Address Bar Code

Ref # 20-19696E
Invoice #
PO #
Dept #

SHIP TO: (615) 277-7570

BILL SENDER

Sample Receiving
ENVIRON
201 Summit View Drive
Lower Level Lab
BRENTWOOD, TN 37027

THU - 10 OCT 10:30A
PRIORITY OVERNIGHT

TRK# 0201 **7968 5288 3312**

37027
TN-US
BNA

NA THAA

51AG1/AB1B/1A9E

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CUSTODY SEAL

Person Collecting Sample _____ (signature) Sample No. _____

Date Collected 10-7-13 Time Collected _____

Sample Receipt Checklist:

Client: BP Whiting

Date/Time received 10/10/13 0830 by HM

1. Cooler sealed and intact upon arrival? (Yes) No
2. Custody seals present? (Yes) No
3. Samples received below 6 degrees Celsius? (Yes) No
4. Was ice present? (Yes) No
5. Is the COC filled out correctly including the sample date/time and signed? (Yes) No
6. Was the sample received within 36 hours of collection? (Yes) No
7. Did the sample(s) arrive in good condition? (Yes) No
8. Was pH and DO measured and in range? (Yes) No
9. Was residual chlorine present? (Yes) No
   - 1.0 mg/L? (did dechlor occur) Yes (No)

Comments:

Batch #	Sample ID	Temp (C°)	pH	DO	TRC
16746	Outfall 001	0.9	8.11	8.4	0.0X

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ENVIRON Test Log No. 16369

Project Name: 005 BP WET Testing Project Number: 30-19676.E

Industry:

Phone: 219-473-3726 FAX:

County: Lake City: Whiting State: Indiana

Sample Collected by (print): Terry Claus

Sample Collected by (signature): Terry Claus

NPDES Permit No.:

NPDES Test: ☐ No ☐ Yes

CHAIN-OF-CUSTODY

ENVIRON

201 Summit View Drive, Suite 300
Brentwood, TN 37027
PHONE: (615) 277-7570
FAX: (615) 377-4976

Sample Location / ID	Comp/Grab	Container Type	Chilled During Collection (Y/N)	Start Date/Time	End Date/Time	No. of Cntrs	Total Volume in liters	Analysis Requested: Acute Fathead minnow	Acute Bannerfin shiner	Acute *Ceriodaphnia dubia*	Acute *Daphnia pulex*	Chronic Fathead minnow	Chronic *Ceriodaphnia dubia*	Continuous Batch Tests	Discrete Batch Tests	Other Toxicity Testing	Description Definitive or Screen	Sample B# (lab only)
OUTFall 005	Comp	10 L	YES	10-10-13 0800	10-11-13 0805	1	9									X		16756

* Matrix: **SS** - Soil **GW** - Groundwater **WW** - Wastewater **AW** - Ambient Water ML - Mixed Liquor SL - Sludge **SD** - Sediment **OT** - Other

Remarks: Composite samples were chilled during collection and packed with sufficient ice to ensure a laboratory arrival Temperature of 0-6 degrees C.

Measured TRC (if applicable): _____ mg/L

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Samples shipped via: ☒ FedEx ☐ Other Courier ☐ UPS ☐ Hand Delivered	Condition: (lab use only)
Terry Claus	10-11-13	1300			good
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Receipt Temp: 0.5°C	Containers/Volume Received: 1 10L
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature) Anita Bryant-Winton	Date: 10/12/13	Time: 0920

pH upon arrival: 8.01

DO upon arrival: 10.3

From: (219) 805-3821
Terry Claus

5900 Industrial Highway

Gary, IN 46406

Origin ID: MGCA

FedEx Express

Ship Date: 11OCT13
ActWgt: 60.0 LB
CAD: 105107501/NET3430

Dims: 24 X 13 X 14 IN

Delivery Address Bar Code

SHIP TO: (615) 277-7570

BILL SENDER

Sample Receiving
ENVIRON
201 Summit View Drive
Lower Level Lab
BRENTWOOD, TN 37027

Ref # 20-19696E
Invoice #
PO #
Dept #

SATURDAY 12:00P
PRIORITY OVERNIGHT

TRK# 0201 7968 5291 5642

X0 THAA

37027
TN-US
BNA

51AG1/AB19/1A9E

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CUSTODY SEAL

Person Collecting Sample Terry Cleary (signature) Sample No. _____

Date Collected 10-11-13 Time Collected _____

ENVIRON Test Log No. 16369

Sample Receipt Checklist:

Client: BP Whiting

Date/Time received 10/12/13 0920 by AW

1. Cooler sealed and intact upon arrival? (Yes) No
2. Custody seals present? (Yes) No
3. Samples received below 6 degrees Celsius? (Yes) No
4. Was ice present? (Yes) No
5. Is the COC filled out correctly including the sample date/time and signed? (Yes) No
6. Was the sample received within 36 hours of collection? (Yes) No
7. Did the sample(s) arrive in good condition? (Yes) No
8. Was pH and DO measured and in range? (Yes) No
9. Was residual chlorine present? Yes (No)
   - 1.0 mg/L? (did dechlor occur) Yes (No)

Comments:

Batch #	Sample ID	Temp (C°)	pH	DO	TRC
16756	Outfall005	0.5	8.01	10.3	<0.02

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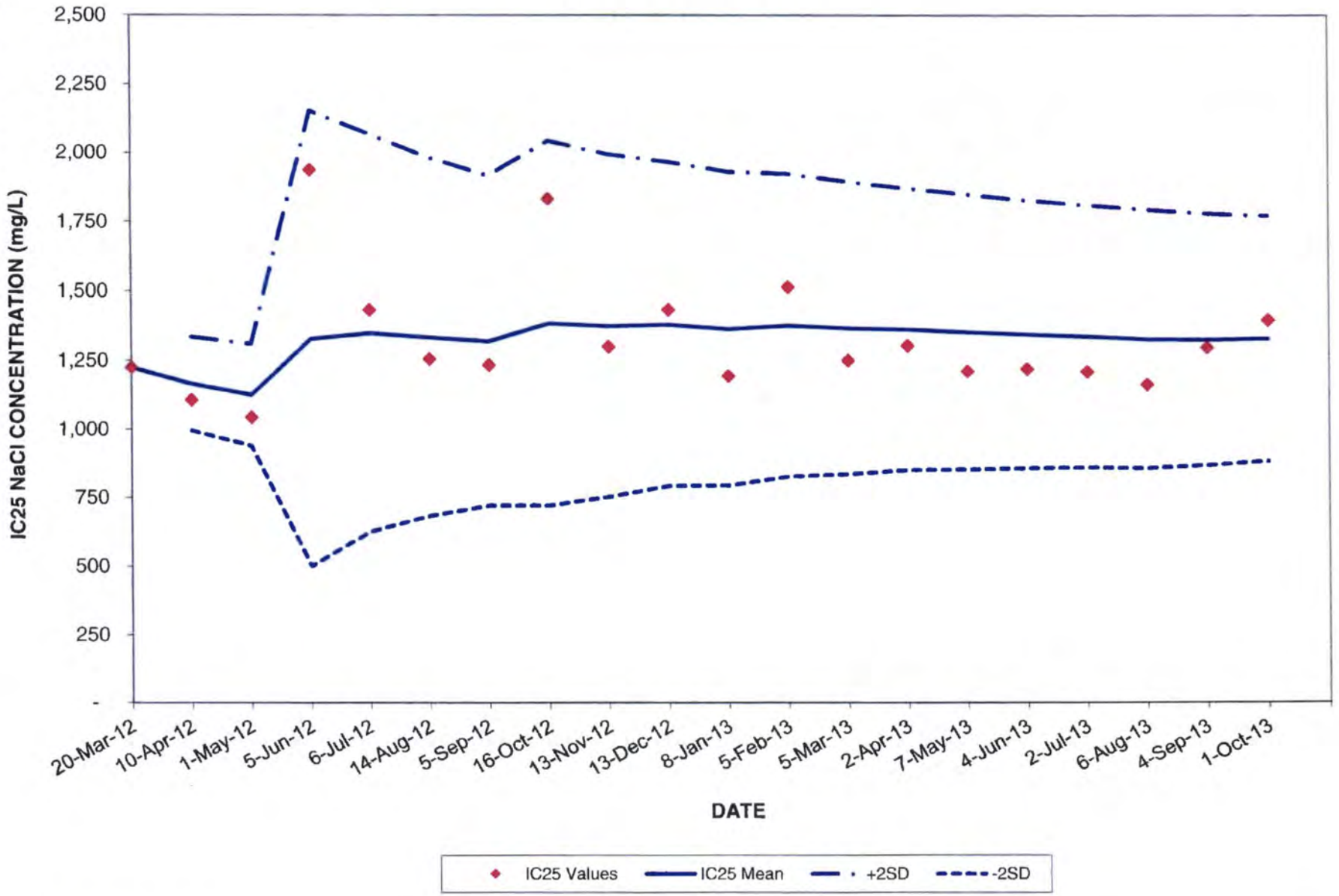
Attachment 5:
Reference Toxicant Data

CHRONIC REFERENCE TOXICANT TEST (NaCl) 2012 - 2013
FATHEAD MINNOWS



Fathead Minnow CHRONIC REFERENCE TOXICANT TESTING-SODIUM CHLORIDE (NaCl) 2012 - 2013

Test Number	Log Number	Test Initiation Date	Control Survival (%) (*)	Control Mean Dry Weight (mg/fish) (*)	SURVIVAL NOEC (mg/L)	SURVIVAL LOEC (mg/L)	GROWTH NOEC (mg/L)	GROWTH LOEC (mg/L)	PMSD (%)	IC25 VALUE (mg/L)	IC25 CUMULATIVE MEAN (mg/L)	IC25 ST. DEV. (mg/L)	IC25 2+ STD. DEV.	IC25 2- STD. DEV.	Coefficient of Variation (%)
1	15248	20-Mar-12	100	0.383	750	1,500	750	1,500	28.1	1,225	1,225				
2	15299	10-Apr-12	100	0.716	750	1,500	750	1,500	17.0	1,105	1,165	85	1,335	995	5
3	15343	01-May-12	100	0.562	750	1,500	750	1,500	25.0	1,042	1,124	93	1,310	938	7
4	15115	05-Jun-12	100	0.499	750	1,500	1,500	3,000	24.0	1,937	1,327	414	2,154	500	27
5	15463	06-Jul-12	100	0.397	750	1,500	1,500	3,000	26.5	1,431	1,348	361	2,070	626	24
6	15548	14-Aug-12	100	0.406	750	1,500	750	1,500	24.6	1,254	1,332	325	1,983	682	22
7	15603	05-Sep-12	100	0.429	750	1,500	750	1,500	16.7	1,232	1,318	299	1,917	719	21
8	15683	16-Oct-12	97.5	0.447	1,500	3,000	1,500	3,000	19.0	1,832	1,382	331	2,045	719	22
9	15743	13-Nov-12	100	0.514	750	1,500	750	1,500	15.9	1,297	1,373	311	1,995	750	21
10	15807	13-Dec-12	100	0.362	750	1,500	750	1,500	17.1	1,430	1,379	294	1,967	790	20
11	15863	08-Jan-13	100	0.431	750	1,500	750	1,500	15.5	1,190	1,361	285	1,931	792	20
12	15911	05-Feb-13	95	0.417	750	1,500	750	1,500	20.9	1,512	1,374	275	1,924	824	19
13	15965	05-Mar-13	100	0.538	750	1,500	750	1,500	28.1	1,246	1,364	266	1,895	833	19
14	16017	02-Apr-13	100	0.504	750	1,500	750	1,500	25.8	1,300	1,360	256	1,871	848	18
15	16088	07-May-13	100	0.390	750	1,500	750	1,500	29.3	1,207	1,349	250	1,848	850	18
16	16137	04-Jun-13	100	0.402	750	1,500	750	1,500	21.5	1,215	1,341	243	1,828	854	18
17	16189	02-Jul-13	100	0.444	750	1,500	750	1,500	26.7	1,205	1,333	238	1,809	857	17
18	16256	06-Aug-13	100	0.382	750	1,500	750	1,500	19.3	1,157	1,323	235	1,792	854	17
19	16309	04-Sep-13	97.5	0.369	750	1,500	750	1,500	27.1	1,293	1,322	228	1,778	865	17
20	16348	01-Oct-13	97.5	0.310	1,500	3,000	750	1,500	23.4	1,391	1,325	223	1,770	880	16
		Avg	99	0.445	825	1650	863	1725	23	1325	1321	264	1854	799	

Notes:

Dilution series -0.375 g/L - 6.0 g/L

NOEC - No Observable Effect Concentration (survival or growth)

LOEC - Lowest Observable Effect Concentration (survival or growth)

ACCEPTABLE TEST RESULTS - A growth NOEC ranging from 750 mg/L to 3,000 mg/L.

(*) Minimum USEPA CONTROL CRITERIA - 80 percent survival and average dry weight of 0.25 mg (weight based on surviving number of fish).

Test Log 15132 intiated Feb 7, 2012 was invalidated due to standard deviation over 2x